PREVENTING ANTIBIOTIC RESISTANCE THE LOUISIANA PROGRAM

Infectious Disease Epidemiology Section
Office of Public Health
Louisiana Dept of Health & Hospitals

...Your Taxes at Work...

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Surveillance

Passive Surveillance

ROSSTAB WIZARD

EMERGENCY DEPT SYNDROMIC SURVEILLANCE

Y - EMS SYNDROMIC SURVEILLANCE

REPORTS

MY SETTINGS

LOG OUT

REPORTABLE DISEASE DATABASE

CENTRAL SITE

|CDC||LA OPH||APIC||CDC Health Alert|

Iave a nice day!

MAIN MENU

Public Health

LOUISIANA
Department of HEALTH and HOSPITALS

Passive Surveillance

- Web based reporting system for Infectious Diseases
- Reportable Diseases
  - →MRSA Invasive Disease
  - →VRE Invasive Disease
  - →DRSP
- Limited Value

Passive Surveillance

EventName	1997	1998	1999	2000	2001
Enterococcus faecium	80	178	122	168	208
Enterococcus fecalis	10	23	25	35	36
Enterococcus spp	25	77	73	175	119
MRSA	490	936	1056	3689	4249
Drug Resistant S.pneumoniae	121	166	116	57	105

Active Surveillance

- Phone calls
- 30 hospital laboratories
- Lab aggregate data:
  - → # resistant / # tested
  - → No duplicates
- MRSA, DRSP,VRE

Laboratory Surveillance

- **OPH laboratory-based ab resistance surveillance**
- **Select bacterial pathogens**
  - → Staphylococcus species with reduced susceptibility or with intermediate resistance to vancomycin,
  - → Haemophilus Influenzae,
  - → Neisseria meningitidis.
  - → enteric pathogens:
    - Salmonella (10% total sample size),
    - Shigella (20% total sample size),
    - Campylobacter (25% total sample size)
- **ONLY isolates from invasive disease or sterile site**
- **Send to OPH Laboratory**
- **OPH participates in the National Antimicrobial Resistance Monitoring System (NARMS) by submitting every 10th non-typhoidal Salmonella isolate and one Campylobacter isolate per week to CDC for susceptibility testing.**

MRSA in the US

NNIS - nosocomial *S. aureus* isolates:

- **1991: 29% MRSA**
- **1999: 52.3% MRSA**
- **37% ⇧ in resistance when compared to the mean resistance over previous 5 years**

MRSA in Louisiana

- **Active surveillance for MRSA**
  - → 1997-1999: 33%
  - → 2000: 38%
  - → 2001: 45%

- **Passive system:**
  - → State Rate: 77.8 per 100,000
  - → Passive system modified several times
  - → NOW focus on MRSA invasive disease
  - → To monitor severe disease
  - → Unrealistic to use passive surveillance to evaluate disease burden

Streptococcus pneumoniae

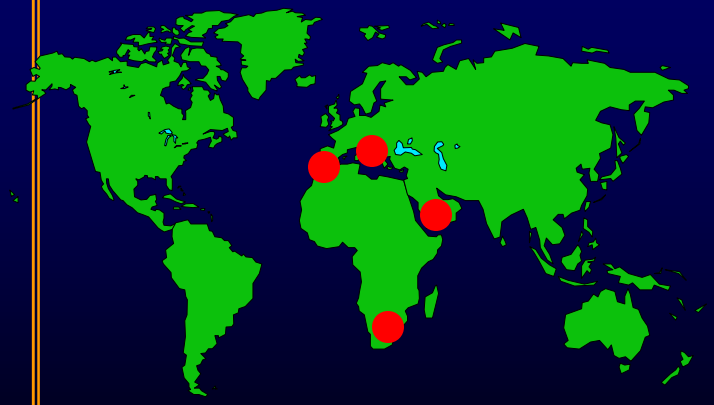
Infection type	Cases	Mortality
Otitis media	7,000,000	
Pneumonia	500,000	5%
Bacteremia	50,000	20%
Meningitis	3,000	30%
Deaths		40,000

NCCLS defined

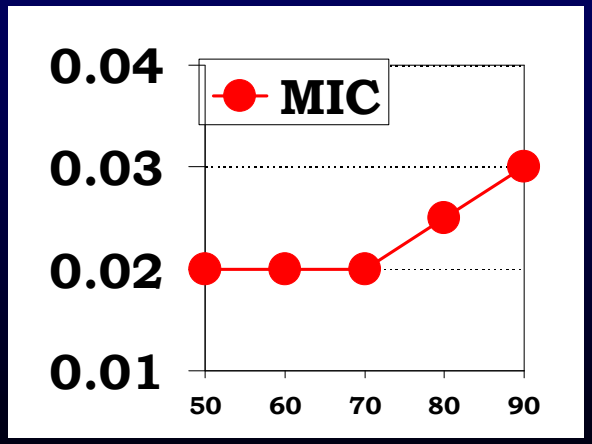
susceptible	**MIC < 0.06**
intermediate	**0.12 < MIC < 1.0**
resistant	**MIC > 2.0**

→ penicillin effective on bacteria classified as resistant

→ for CSF , penicillin not effective



25-50%



DRSP in Louisiana

- **Active surveillance for DRSP**
  - → **1997-1999: 21%**
  - → **2000: 42%**
  - → **2001: 48%**
- **Passive system:**
  - → Region 1 had the highest rate in 2000
  - → **39.5/100,000**

Vancomycin Resistant Enterococcus (VRE)

- **Nationwide (NNIS Data):**
  - → **1989: 0.3%**
  - → **1993: 13.6%**
  - → **1999: 25.2%**
  - → **attributable mortality 40-50%**

- **Statewide:**
  - → **1996: 1% resistant**
  - → **1997: 3% resistant**
  - → **1998: 5% resistant**

Louisiana Antibiogram

- Most hospitals issue once a year an "Antibiogram"
- Table listing bacteria and antibiotics showing sensitivity
- Shows the spectrum of resistance for common bacteria detected by hospital lab
- Useful information for the selection of empiric antibiotic treatment before specific results known

- Statewide Antibiogram is a compilation of individual hospital antibiograms
- Useful to compare one individual hospital antibiogram to the rest of the state.

Louisiana Antibiogram

Louisiana Office of Public Health
Infectious Disease Epidemiology Section
Phone: 1-800-256-2748
www.oph.dhh.state.la.us

Louisiana Antibiogram (Antimicrobial Susceptibilities of Selected Pathogens) 1999-2000
For epidemiologic purpose ONLY – Not for making therapeutic decisions

Cocci Gram +	# of hospital	Peni -cillin	Oxa -cillin	Augmen -tin	Cepha -lotin	Cefa -zolin	Cefo -taxime	Ceftri -axone	Clinda -mycin	Erythro -mycin	Genta -micin	Cipro -flox	Nor -flox	Tetra -cycline	Tmp Sxt	Vanco mycin
Staph aureus, coag + (1)	17	9-18	30-80	60-99	85*	56-95	70-76		90-99	50-78	82-99	65-85			89-99	100
MRSA only	7								60-75	15-40	70-82	15-25	70*		78-98	100
Staph epidermidis coag neg	16	3-20	15-40	30-80	83*	20-95	30*		65-85	25-65	50-98	45-85			50-80	100
Streptococcus Grp A	2	91-100	83-92	77-100		91-100	82-93		100	90-91	100					100
Streptococcus Grp B	4	100							85-90	70-100						100
Strep. pneumoniae	12	33-99		48-50*		50*	75-90	80-90*	90-95	45-90	70-90			80-90	35-80*	100
Enterococcus fecalis	12									25-61	27-80	45-70		24-56		97-100
Enterococcus faecium	8									9-20	30	5-25		13-50		30-95
Enterococcus spp	4													36-40	25	93-100

Cocci Gram -	# of hospital	Peni -cillin	Ampi -cillin	Ticar -cilli	Cepha -lotin	Pipera -cillin	Augmen -tin	Tim -entin	Aztreo -nam	Imipe -nem	Cefuro -xime	Cefo -taxime	Ceftaz -idime	Ceftri -axone	Cefi -xime	Tmp Sxt
Acinetobacter	8			50-85		28-64	80*		11-44	95-100		75	40-90	52-80		50-95
Hemophilus influenzae	9		60-80				87-96*				93-96	100		94-100	100	70-85
Neisseria gonorrheae	2	65-80												100		
Neiseria meningitidis	2	100														

Bacilli Gram – Enterobacteriaceae	# of hospital	Ampi -cillin	Pipera -cillin	Ticar -cilli	Augm entin	Tim -entin	Aztreo -nam	Imipe -nem	Cefuro -xime	Cefo -xitine	Cefa -zoline	Cefo -taxim	Ceftaz -idime	Ceftri -axone	Nitro -furant	Cipro -flox	Nor -flox	Genta -micin	Tobra -mycin	Amika -cin	Tetra cycline	Tmp Sxt
Citrobacter spp	20	8-11	40-88		53-76	71-100	71-100	100	50-80	50-94	20-40	73-100	67-100	75-100	90-100	82-100	100	86-100	90-100	98-100	67-100	70-100
Enterobacter spp	20	2-50	51-85	50-99	20-86	29-99	57-95	100	34-66	4-6	2-11	56-91	55-98	61-86	25-100	81-99	75-100	82-100	80-100	98-100	50-88	70-100
E.coli	15	32-63	46-62	24-61	42-66	79-100	95-100	97-100	75-100	88-100	77-92	92-100	85-100	83-100	75-99	89-100	91-100	93-100	97-100	98-100	76-87	78-100
Klebsiella spp	15	1-6	48-91	11	72-80	87-100	88-100	99-100	81-91	87-100	75-100	75-99	86-99	83-100	55-80	88-97	81-100	85-100	84-100	95-100	82-87	62-100
Proteus spp	15	81-99	90-100	81-100	92-100	99-100	91-100	92-100	99-100		77-99	95-100	97-100	99-100	28-98	81-100	90-100	92-100	89-100	95-100	1-3	77-98
Salmonella spp	2	87-88	88-89	78-86			74	96		95	96	96	96	89-92		100		100	100	100		93-100
Shigella spp	2	22	64	66						100	100	100	100					100	100	100		83-100
Serratia spp	15		80-100			96-100	87-100	97-100				91-100	76-100	88-100		91-100		95-100	90-100	98-100		86-100
Other Gram – Rods																						
Pseudomonas aeruginosa	15		81-95			72-78	20-79	83-96				4-22	83-93			41-83		51-93	89-100	87-99		2-5
Xanthomonas maltophilia	4		16	16		33-88										31-100		17-50	15-16	17-50		80-100

*Only 1 or 2 hospital reporting
(1)Some hospital may have included MRSA in the total Staph aureus
Based on 15 reports

Community Outbreak Investigation

Prison Outbreak Investigation

- Oct/Nov 2001: all skin infections cultured
- 1,600 inmates
- 42 viable cultures:
  - → 11MSSA
  - → 28 MRSA
    (71% of pos cultures)
  - → 3 Other
- 210 MRSA Skin infections /1,000 pop /yr

Prison Outbreak Investigation

- MRSA Multi-sensitive strain
- % sensitive to
  - →Cipro 73%
  - →Clindamycin 84%
  - →Tetracycline 61%
  - →TMP-SXT 73%

- PFGE in prison outbreak
  - 5 type G61
  - 4 type G36

- PFGE in city isolates from hospitals
  - 32% G36
  - 54% G61
- High prevalence of few PFGE types

Educational Motivational Programs for Professionals

Building a Coalition

Statewide Antibiotic Resistant Pathogens Advisory Committee SARPAC)

Resistant Staphylococcus aureus Management Guidelines

MRSA & VRSA

TABLE OF CONTENTS

Guidelines for the Management of Antibiotic Resistant Pathogens in Health Care Facilities

Background

The Antibiotic Sensitivity Active Surveillance System commenced five years ago in an attempt to track the emergence of antibiotic resistant organisms. Until January 2002, the surveillance system was called the Emerging Pathogens Active Surveillance System. This federally funded surveillance program allows Louisiana to be part of a nationwide project to track and evaluate antibiotic resistant trends. Our surveillance system monitors three pathogens: Methicillin resistant *Staphylococcus aureus* (MRSA), drug resistant *Streptococcus pneumoniae* (DRSP), and Vancomycin resistant enterococcus (VRE).

The goals of the Antibiotic Sensitivity Active Surveillance System are:

1. To estimate the percent of selected bacteria in the state that are resistant to antibiotics, (MRSA, DRSP, and VRE) by the reporting of laboratory aggregate data

2. To describe the demographic characteristics of newly infected cases through the reporting of information as required by the Louisiana Sanitary Code, Chapter II, Section 2:003 and 2:004

The Surveillance System

There are two components to the Antibiotic Sensitivity Surveillance System. First, the Microbiology laboratory should report the total number of *Staphylococcus aureus, Streptococcus pneumoniae*, and enterococcus

Themes: CDC Campaign

Campaign to Prevent Antimicrobial Resistance

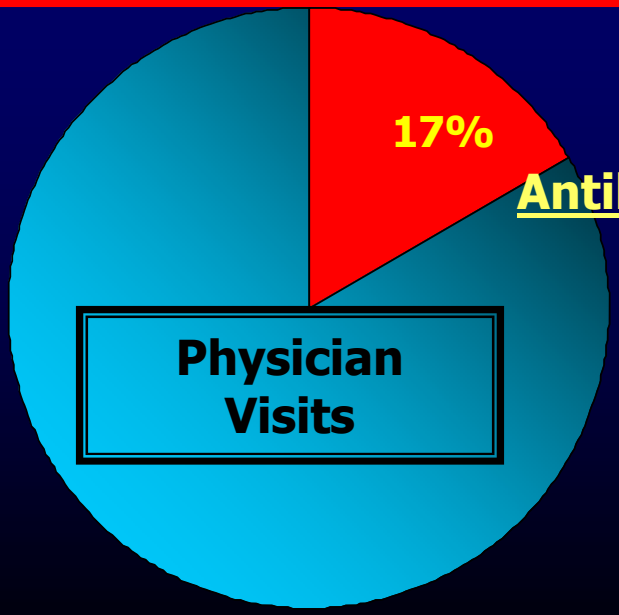
Centers for Disease Control and Prevention
National Center for Infectious Diseases
Division of Healthcare Quality Promotion

Clinicians hold the solution!

Themes: The Big Five Campaign

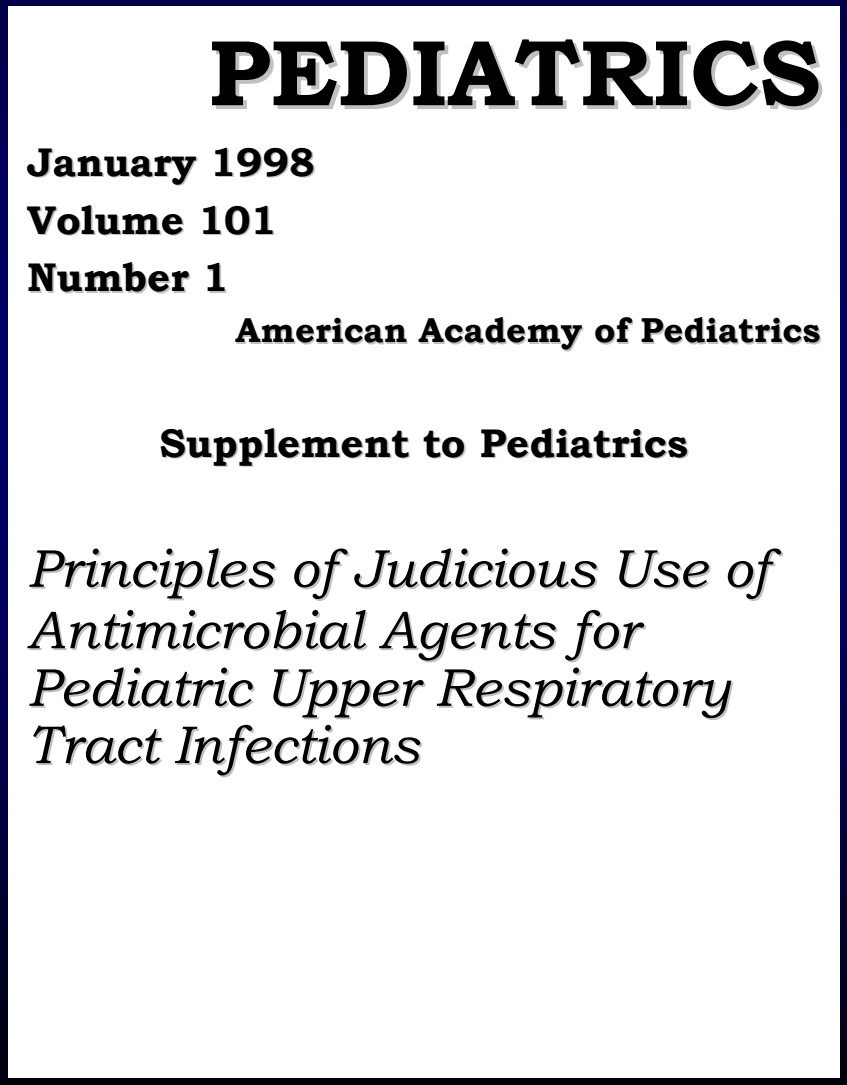
	Est Visit in La /year
• Non Specific URTI	30,000
• Bronchitis	30,000
• Pharyngitis	20,000
• Sinusitis	40,000
• Otitis Media	40,000

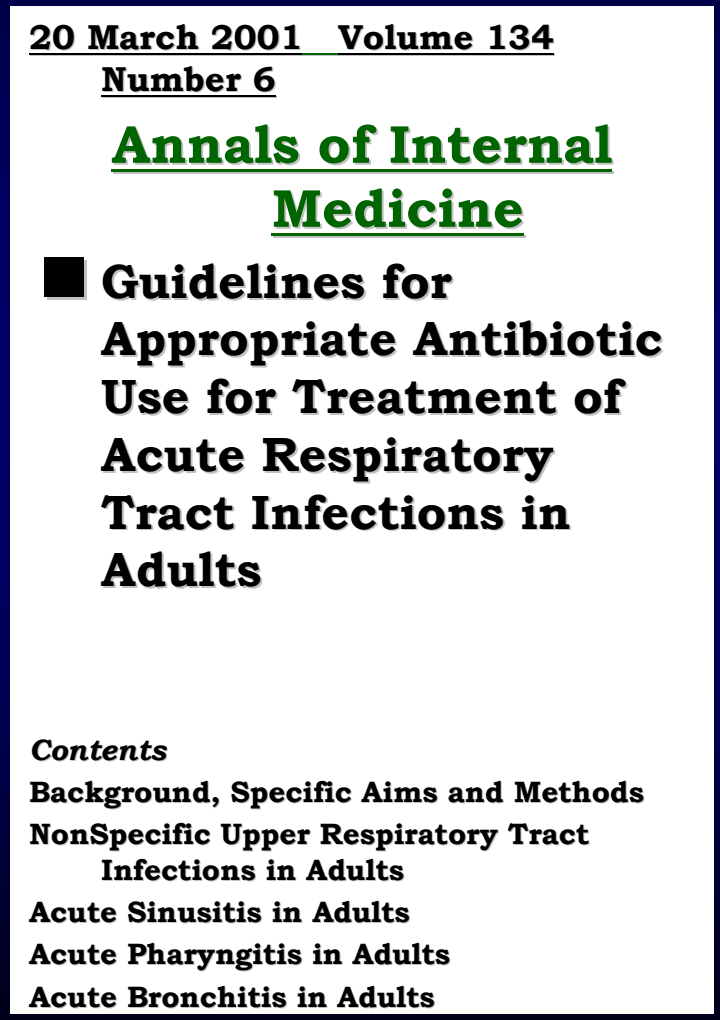
**URTI= Upper Respiratory Tract Infection*



= 75% of all antibiotic Rx

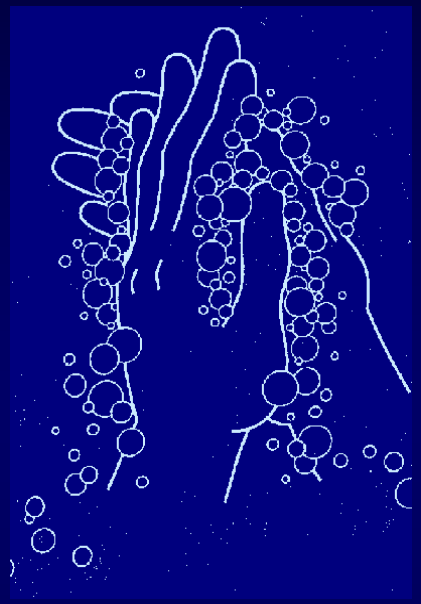
Theme: Promoting Guidelines





Theme: Infection Control Campaign
Prevent Propagation

- **propagation from**
  - →1-spread of the resistance strain in a single host
  - →2-spread of the resistance between bacterial populations in different hosts
  - →handwashing and barrier precautions



- **transmission networks more intense in hospital setting, less in the community: infection control**

Theme: Campaign for Hospital Controls

- **Educational & Persuasive Approaches**
  minor effect

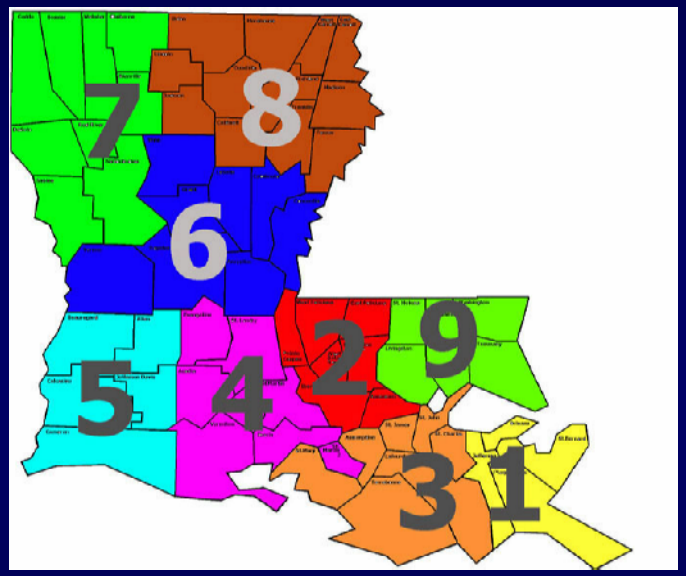
- **Facilitative Strategies**
  - → **clinical specialist or pharmacy clinician to advise**
  - → **computer help screens when ordering**

Power Strategies

- → **Formulary Control**
- → **Monitor usage with time limits on prophylactic, empiric, therapeutic uses**
- → **Restriction of Drugs classified as:**
  - **Uncontrolled: available for all physicians,**
  - **Monitored: usage monitored thru system**
  - **Restricted: ID specialist only**

The Trainers

- **Infectious Disease Epidemiology Section**
- **Infection Control Nurse Consultant**
- **Surveillance Epidemiologists**



- **Regional Directors**
- **Regional Epidemiologists**
- **Regional Disease Surveillance Specialists**

- **Members of the Statewide Antibiotic Resistant Pathogens Advisory Committee**

Health Care Plans

- Blue Cross Blue Shield of Louisiana
- Oschner Health Plan
- Tenet Choices
- United Healthcare

Medical Curriculum

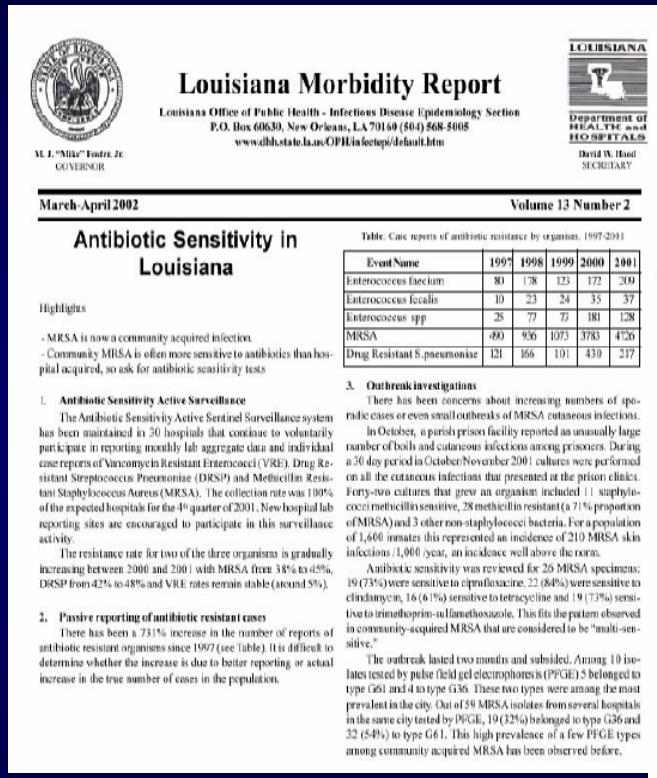
UNIVERSITY PARTNERSHIPS

- **TULANE UNIVERSITY SCHOOL OF MEDICINE AND SCHOOL OF PUBLIC HEALTH**
- **LOUISIANA STATE UNIVERSITY SCHOOL OF MEDICINE**

LSU & Tulane University

Reaching out to Physicians /HCW
Louisiana Morbidity Report

Distributed to 8,000 physicians



Louisiana Morbidity Report

Louisiana Office of Public Health - Infectious Disease Epidemiology Section
P.O. Box 60630, New Orleans, LA 70160 (504) 568-5005
www.dhh.state.la.us/OPH/infectepi/default.htm

M. J. "Mike" Foster Jr. GOVERNOR

David W. Hood SECRETARY

March-April 2002 Volume 13 Number 2

Antibiotic Sensitivity in Louisiana

Highlights

- MRSA is now a community acquired infection.
- Community MRSA is often more sensitive to antibiotics than hospital acquired, so ask for antibiotic sensitivity tests

1. **Antibiotic Sensitivity Active Surveillance**

The Antibiotic Sensitivity Active Sentinel Surveillance system has been maintained in 30 hospitals that continue to voluntarily participate in reporting monthly lab aggregate data and individual case reports of Vancomycin Resistant Enterococci (VRE). Drug Resistant Streptococcus Pneumoniae (DRSP) and Methicillin Resistant Staphylococcus Aureus (MRSA). The collection rate was 100% of the expected hospitals for the 4th quarter of 2001. New hospital lab reporting sites are encouraged to participate in this surveillance activity.

The resistance rate for two of the three organisms is gradually increasing between 2000 and 2001 with MRSA from 38% to 45%, DRSP from 42% to 48% and VRE rates remain stable (around 5%).

2. **Passive reporting of antibiotic resistant cases**

There has been a 731% increase in the number of reports of antibiotic resistant organisms since 1997 (see Table). It is difficult to determine whether the increase is due to better reporting or actual increase in the true number of cases in the population.

Table. Case reports of antibiotic resistance by organism, 1997-2001

Event Name	1997	1998	1999	2000	2001
Enterococcus faecium	80	178	123	172	209
Enterococcus faecalis	10	23	24	35	37
Enterococcus spp	28	77	73	181	128
MRSA	490	936	1073	3783	4726
Drug Resistant S.pneumoniae	121	166	101	439	217

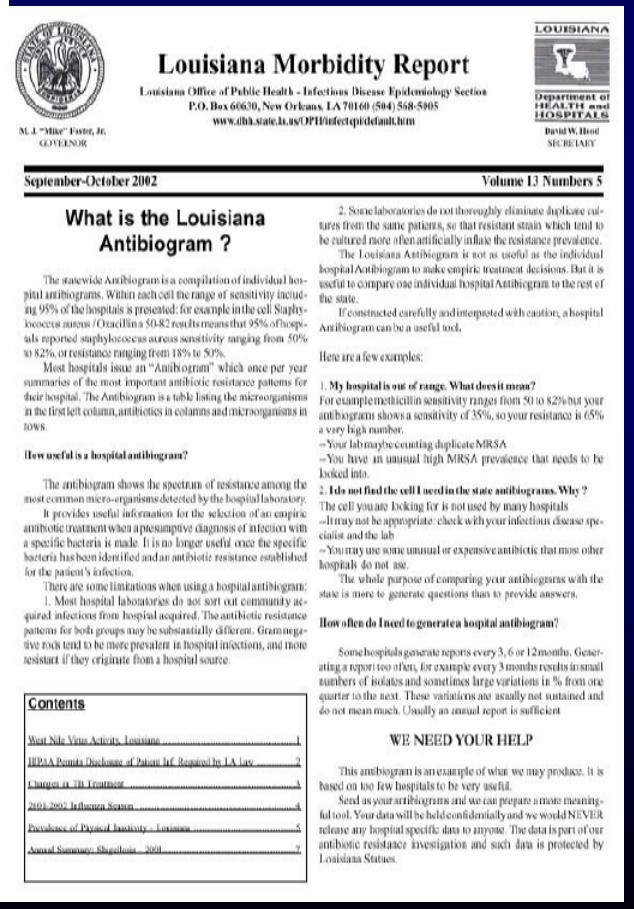
3. **Outbreak investigations**

There has been concerns about increasing numbers of sporadic cases or even small outbreaks of MRSA cutaneous infections.

In October, a parish prison facility reported an unusually large number of boils and cutaneous infections among prisoners. During a 30 day period in October/November 2001 cultures were performed on all the cutaneous infections that presented at the prison clinics. Forty-two cultures that grew an organism included 11 staphylococci methicillin sensitive, 28 methicillin resistant (a 71% proportion of MRSA) and 3 other non-staphylococci bacteria. For a population of 1,600 inmates this represented an incidence of 210 MRSA skin infections / 1,000 /year, an incidence well above the norm.

Antibiotic sensitivity was reviewed for 26 MRSA specimens: 19 (73%) were sensitive to ciprofloxacine, 22 (84%) were sensitive to clindamycin, 16 (61%) sensitive to tetracycline and 19 (73%) sensitive to trimethoprim-sulfamethoxazole. This fits the pattern observed in community-acquired MRSA that are considered to be "multi-sensitive."

The outbreak lasted two months and subsided. Among 10 isolates tested by pulse field gel electrophoresis (PFGE) 5 belonged to type G61 and 4 to type G36. These two types were among the most prevalent in the city. Out of 59 MRSA isolates from several hospitals in the same city tested by PFGE, 19 (32%) belonged to type G36 and 32 (54%) to type G61. This high prevalence of a few PFGE types among community acquired MRSA has been observed before.



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September-October 2002 Volume 13 Numbers 5

What is the Louisiana Antibiogram ?

The statewide Antibiogram is a compilation of individual hospital antibiograms. Within each cell the range of sensitivity including 95% of the hospitals is presented: for example in the cell Staphylococcus aureus /Oxacillin a 50-82 results means that 95% of hospitals reported staphylococcus aureus sensitivity ranging from 50% to 82%, or resistance ranging from 18% to 50%.

Most hospitals issue an "Antibiogram" which once per year summaries of the most important antibiotic resistance patterns for their hospital. The Antibiogram is a table listing the microorganisms in the first left column, antibiotics in columns and microorganisms in rows.

How useful is a hospital antibiogram?

The antibiogram shows the spectrum of resistance among the most common micro-organisms detected by the hospital laboratory.

It provides useful information for the selection of an empiric antibiotic treatment when a presumptive diagnosis of infection with a specific bacteria is made. It is no longer useful once the specific bacteria has been identified and an antibiotic resistance established for the patient's infection.

There are some limitations when using a hospital antibiogram:

1. Most hospital laboratories do not sort out community acquired infections from hospital acquired. The antibiotic resistance patterns for both groups may be substantially different. Gram negative rods tend to be more prevalent in hospital infections, and more resistant if they originate from a hospital source.

2. Some laboratories do not thoroughly eliminate duplicate cultures from the same patients, so that resistant strain which tend to be cultured more often artificially inflate the resistance prevalence.

The Louisiana Antibiogram is not as useful as the individual hospital Antibiogram to make empiric treatment decisions. But it is useful to compare one individual hospital Antibiogram to the rest of the state.

If constructed carefully and interpreted with caution, a hospital Antibiogram can be a useful tool.

Here are a few examples:

1. **My hospital is out of range. What does it mean?**
For example methicillin sensitivity ranges from 50 to 82% but your antibiograms shows a sensitivity of 35%, so your resistance is 65% a very high number.
- Your lab may be counting duplicate MRSA
- You have an unusual high MRSA prevalence that needs to be looked into.

2. **I do not find the cell I need in the state antibiograms. Why ?**
The cell you are looking for is not used by many hospitals
- It may not be appropriate: check with your infectious disease specialist and the lab
- You may use some unusual or expensive antibiotic that most other hospitals do not use.

The whole purpose of comparing your antibiograms with the state is more to generate questions than to provide answers.

How often do I need to generate a hospital antibiogram?

Some hospitals generate reports every 3, 6 or 12 months. Generating a report too often, for example every 3 months results in small numbers of isolates and sometimes large variations in % from one quarter to the next. These variations are usually not sustained and do not mean much. Usually an annual report is sufficient

Contents

WE NEED YOUR HELP

This antibiogram is an example of what we may produce. It is based on too few hospitals to be very useful.

Send us your antibiograms and we can prepare a more meaningful tool. Your data will be held confidentially and we would NEVER release any hospital specific data to anyone. The data is part of our antibiotic resistance investigation and such data is protected by Louisiana Statues.

Educational Motivational Programs for Public

Public

- **Distribution of Brochures at physician's practices and hospital outpatient services to promote appropriate antibiotic use. Main focus pediatricians and other primary care physicians.**

- **Distribution of flyers at pharmacies statewide with each antibiotic prescription filled including information on how to reduce the spread of resistance**

Evaluation

Antibiotic Use: Medicaid Study

- Year 2000
- Medicaid population = 720,615 people
- 16% of state population
- Records for 530,598 Rx written for 186,658 patients
- limited list of ICD9 codes selected for their potential of including unnecessary antibiotic prescriptions

Antibiotic Use: Medicaid Study

Disease /condition	Number of prescriptions	Observed % with antibiotics	% with antibiotics according to best use standard
Common cold	11,144	32%	0%
Influenza	1,528	22%	0%
Viral pneumonia, unspecified	231	27%	0%
Miscellaneous viral infections	17,895	25%	0%
Upper Respiratory Infection	80,199	32.20%	0%
Pharyngitis	41,041	42%	15%
Tonsillitis	11,690	50%	15%
Acute bronchitis	25,676	30%	0-5%
Otitis Media, suppurative	8,264	50%	
Otitis Media, NON suppurative	11,957	44%	
Sinusitis	40,767	32.30%	Few %

Antibiotic Use: Medicaid Study

- For same diagnostic categories: shows that the younger age groups receive more often unnecessary antibiotics
- Mean age of viral infections treated with antibiotics is 8 while the mean age of those not treated with antibiotics is 17.